U.S. Forest Service

RESEARCH NOTE

CENTRAL STATES FOREST EXPERIMENT STATION
COLUMBUS, OHIO R. D. LANE, DIRECTOR

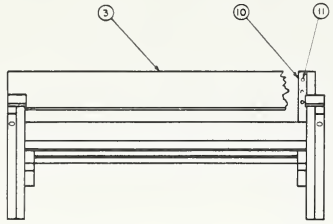
CS-11 August 1963

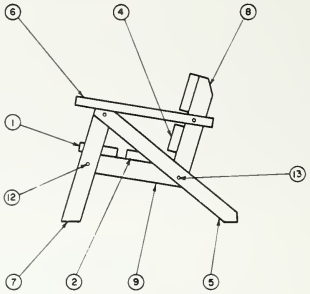
DESIGN FOR A HARDWOOD BENCH

An attractive, sturdy, and comfortable bench made from hardwood lumber has been designed at the Carbondale, Illinois, office of the Central States Forest Experiment Station. It is 5 feet long (fig. 1) and requires 41 board feet of wood parts cut from red oak or hickory 8/4-inch, No. 2 Common, air-dried lumber. This rough lumber costs about $75.00 per thousand board feet in southern Illinois. Assuming a 60 percent yield of usable cuttings, wood parts for this bench would cost $5.12. We estimate that benches can be built for less than $14.00 each for direct labor and all materials in a plant equipped to crosscut, rip, plane, and drill hardwood lumber. They can also be constructed in a home workshop equipped with a power saw. But the cost of lumber will be greater when a planer is not available because dressed rather than rough lumber will have to be purchased.

The wood parts listed in the bill of materials (see plan) can include sound defects such as stain, wormholes, and tight knots 1/4 inch in diameter or smaller. Normal surface checks are also permissible. After both sides are dressed, the parts should be trimmed to desired length, the edges eased on a jointer, table saw, or with a hand plane or sandpaper, and the boltholes and screw holes drilled on a pedestal drill press or with a portable, electric drill. Angle cuts and notching can be done on a table saw or a bandsaw.

Completed parts should be dipped in a wood preservative. We dip them for 5 minutes in a 5-percent solution of water-repellent pentachlorophenol in mineral spirits. A preservative adds years to the service life of the bench. When the parts have dried, the bench can be assembled with ordinary handtools. The legs and arm rests are joined first; then the seat planks and the back planks are attached. All flat-grain planks and arm rests should be installed with the "bark side" of the board upward to reduce splintering and shelling.





NO	DESCRIPTION	SIZE	REQ'D
1	FRONT SEAT PLANK	1 X 7 7/8 X 59 1/2	1
2	REAR SEAT PLANK	1 X 7 7/8 X 59 1/2	1
3	UPPER BACK PLANK	1 X 7 7/8 X 63	1
4	LOWER BACK PLANK	1 X 5 5/8 X 63	1
5	REAR LEG	1 X 3 1/2 X 37 5/8	2
6	ARM REST	1 X 3 5/8 X 27 1/2	2
7	FRONT LEG	1 X 3 5/8 X 23 5/8	2
8	BACK CLEAT	1 X 3 1/2 X 22 1/2	2
9	SEAT CLEAT	1 X 3 1/2 X 20 1/2	2
10	GALV. ANGLE 1/8 THK	1 1/2 X 16	4
11	NO 14-1/2 SCREWS		48
12	BOLTS, NUTS		
	8 WASHERS	3/8 X 3 1/2	6
13	BOLTS, NUTS		
	8 WASHERS	3/8 X 5	4

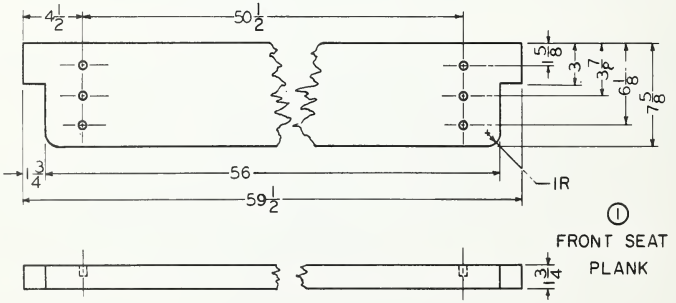
SPECIFICATIONS

ALL PARTS MUST BE SOUND, WITHOUT LOOSE KNOTS, BARK POCKETS, PITH, OR TIGHT KNOTS OVER 1-INCH IN DIAMETER. EDGES ARE EASED 1/4-INCH. SCREW HOLES ARE PREDRILLED, AND ALL PARTS ARE INSTALLED BARK SIDE UP. ANGLE IRON AND OTHER HARDWARE IS GALVANIZED. AFTER ALL FABRICATION AND DRILLING, PARTS ARE TREATED WITH A 5% SOLUTION OF WATER-REPELLENT PENTACHLOROPHENOL IN MINERAL SPIRITS FOR 5 MIN. AFTER THE PRESERVATIVE IS DRY THE BENCH SHOULD BE GIVEN 1 BRUSH COAT OF THE FPL STAIN WITH DOUBLE-STRENGTH PIGMENTS

EXPERIMENTAL HICKORY BENCH

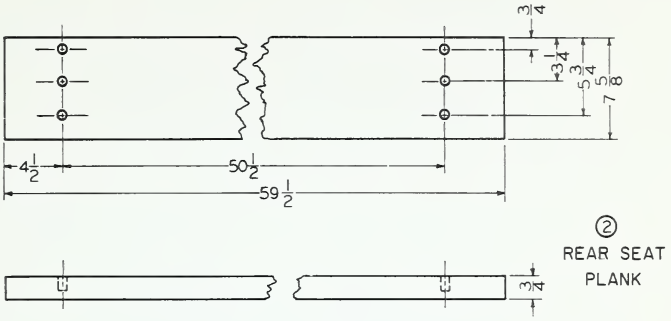
DEVELOPED BY THE
WOOD PRODUCTS PILOT PLANT, CENTRAL STATES FOREST EXPERIMENT STATION, U.S. FOREST SERVICE
IN COOPERATION WITH VOCATIONAL TECHNICAL INSTITUTE OF SOUTHERN ILLINOIS UNIVERSITY

11 MARCH 63	DESIGNED BY G.A.C.	DRAWN BY B.M.



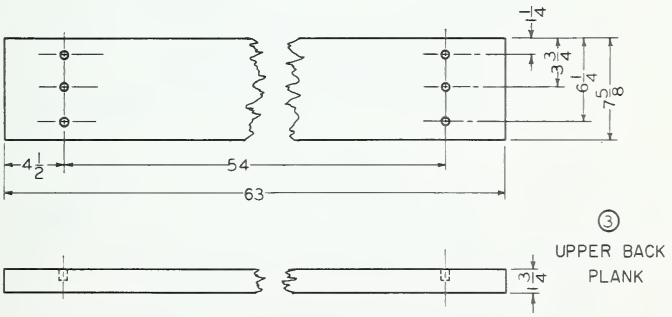
(1) FRONT SEAT PLANK

ALL HOLES ARE DRILLED 3/16 DIAMETER 7/8 DEEP FROM THE HEART SIDE.



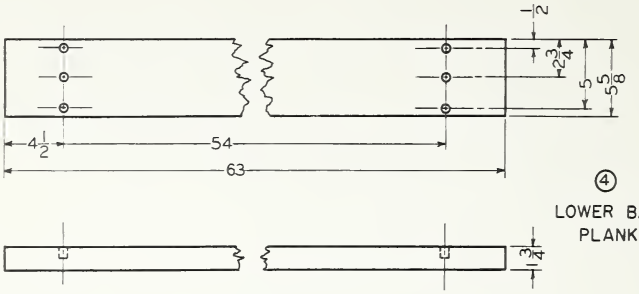
② REAR SEAT PLANK

ALL HOLES ARE DRILLED $\frac{3}{16}$ DIAMETER $\frac{7}{8}$ DEEP, FROM THE HEART SIDE.



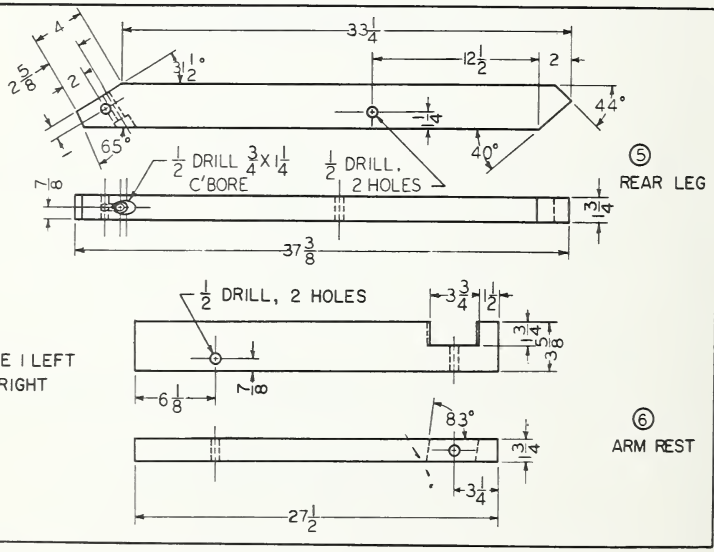
③ UPPER BACK PLANK

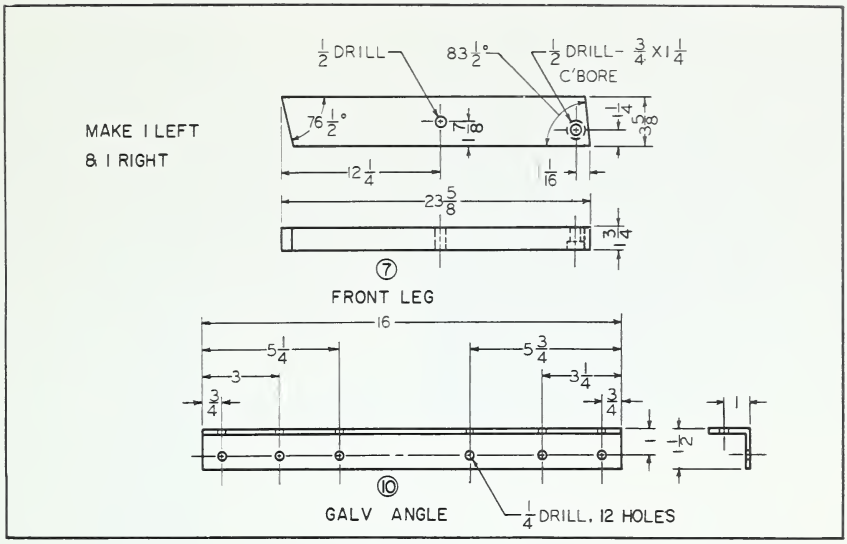
ALL HOLES ARE DRILLED $\frac{3}{16}$ DIAMETER $\frac{7}{8}$ DEEP, FROM THE HEART SIDE.



④ LOWER BACK PLANK

ALL HOLES ARE DRILLED $\frac{3}{16}$ DIAMETER $\frac{7}{8}$ DEEP FROM THE HEART SIDE.




MAKE 1 LEFT
& 1 RIGHT
1/2 DRILL
83 1/2°
1/2 DRILL - 3/4 X 1 1/4
C'BORE
76 1/2°
1 1/8
1 1/4
5/8
12 1/4
1/16
23 5/8
3/4
⑦
FRONT LEG
16
5 1/4
5 3/4
3
3 1/4
3/4
3/4
1
1 1/2
⑩
GALV ANGLE
1/4 DRILL, 12 HOLES

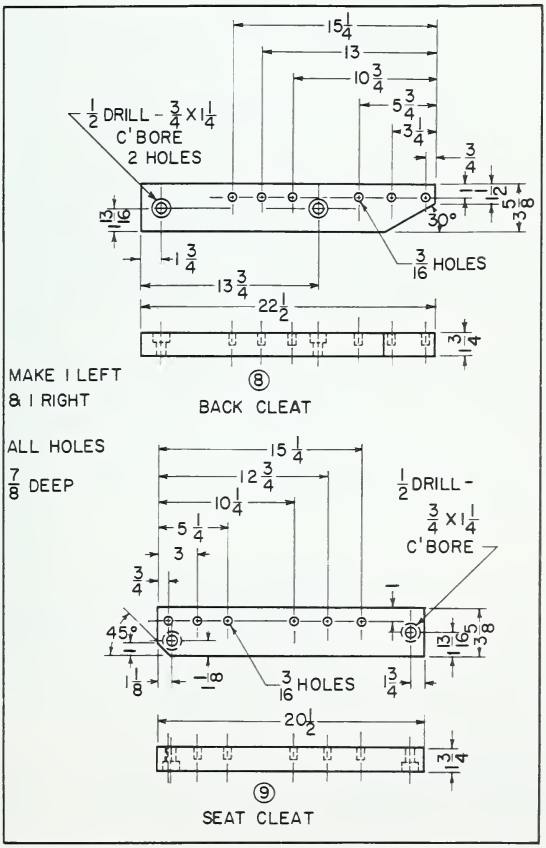

15 1/4
13
10 3/4
5 3/4
3 1/4
1/2 DRILL - 3/4 X 1 1/4
C'BORE
2 HOLES
3/4
1 1/2
13/16
5/8
30°
1 3/4
3/16 HOLES
13 3/4
22 1/2
3/4
MAKE 1 LEFT
& 1 RIGHT
⑧
BACK CLEAT
ALL HOLES
7/8 DEEP
15 1/4
12 3/4
10 1/4
5 1/4
3
3/4
1/2 DRILL -
3/4 X 1 1/4
C'BORE
45°
13/16
5/8
1 1/8
1 1/8
3/16 HOLES
3/4
20 1/2
3/4
⑨
SEAT CLEAT

FIGURE 1.--Because all the parts on this hickory bench are 1 3/4 inches thick and are joined with heavy bolts and screws, the bench is sturdy and can take rough service.

The assembled bench should be coated with a natural finish penetrating stain, preferably a water-repellent preservative type. We brushed benches with the Forest Products Laboratory natural finish made with double-strength pigments.[1/] This stain does not form a film; hence, the benches are easy to refinish.

The bench will seat three persons comfortably. If a longer bench is needed, seat and back planks can be increased 18 inches in length to provide a four-seat bench. No alterations in the legs, arm rests, or cleats would be necessary.

We believe that this bench when properly treated and finished, should give several years' service on either public recreation areas or the home lawn. Because of the low initial cost of hardwood benches and the ease of maintaining them, recreation area managers can provide these benches at a low annual cost.

Glenn A. Cooper,
forest products technologist
Carbondale, Illinois (field
office maintained in cooperation
with Southern Illinois University)

1/ U.S. Forest Products Laboratory. Forest Products Laboratory natural finish. FPL Report No. 2096, 4 pp., revised May 1961.